

Claims

1. A method for controlling at least one micromechanical element, **characterized** in that
 - the micromechanical element is set to an active state with at least a second control signal, and
 - the micromechanical element is held on said active state with at least a first control signal.
2. A method according to claim 1, **characterized** in that the active state is a pull-in state.
3. A method according to claim 1, **characterized** in that the second control signal is a short duration voltage pulse.
4. A method according to claim 1, **characterized** in that the second control signal is a short duration sinusoidal signal.
5. A method according to claim 1, **characterized** in that the second control signal is a short duration pulse train.
6. A method according to claim 1, **characterized** in that the second control signal is a frequency swept waveform.
7. A method according to claim 1, **characterized** in that the first control signal is a constant voltage signal.
8. A method according to claim 1, **characterized** in that the micromechanical element is set to the active state with a sum of the first control signal and the second control signal.
9. A method according to claim 8, **characterized** in that the sum consists of signals with different amplitudes.
10. A method according to claim 8, **characterized** in that the sum consists of signals with different frequencies.
11. A method according to claim 8, **characterized** in that the sum consists of signals with different duty cycles.

12. A method according to claim 8, **characterized** in that the sum consists of signals with different pulse densities.
13. A method according to claim 1, **characterized** in that an amplitude of the second control signal is higher than an amplitude of the first control signal.
- 5 14. A method according to claim 13, **characterized** in that the amplitude of the second control signal is raised with a resonance circuit.
15. A method according to claim 14, **characterized** in that a frequency of the second control signal is 0 - 6 % lower than an electrical resonance frequency of the resonance circuit.
- 10 16. A method according to claim 1, **characterized** in that a harmonic frequency of the second control signal is essentially the same as the mechanical resonance of the micromechanical element.
17. A method according to claim 1, **characterized** in that a harmonic frequency of the second control signal is essentially the same as the electrical resonance of the micromechanical element.
- 15 18. An arrangement for controlling at least one micromechanical element (402), **characterized** in that the arrangement contains at least
- means for generating at least a first control signal and a second control signal,
 - means for raising a voltage level of at least said second control signal,
- 20 - means for feeding said first control signal and said second control signal with raised voltage level to the micromechanical element.
19. An arrangement according to claim 18, **characterized** in that means for generating at least the first control signal and the second control signal contain at least a voltage converter circuit.
- 25 20. An arrangement according to claim 19, **characterized** in that the voltage converter circuit contains at least
- an inductor connected to a DC voltage source,
 - a micromechanical element with an intrinsic capacitance,

- a diode for preventing discharging of said capacitor of said micromechanical element,

- a first switching element for controlling a voltage between said inductor and said diode,

- 5 - a second switching element (803) for resetting said charge of said capacitance (402) of said micromechanical element.

21. An arrangement according to claim 18, **characterized** in that means for raising a voltage level of at least said second control signal contain at least a resonance circuit.

- 10 22. An arrangement according to claim 21, **characterized** in that the resonance circuit consists of an inductor and a capacitance of the micromechanical element.

23. An arrangement according to claim 22, **characterized** in that the capacitance is intrinsic to the micromechanical element.

- 15 24. An arrangement according to claim 22, **characterized** in that the capacitance is external to the micromechanical element.

25. An arrangement according to claim 22, **characterized** in that the inductor and the micromechanical element are integrated on the same substrate.

26. An arrangement according to claim 25, **characterized** in that the substrate is a silicon wafer.

- 20 27. An arrangement according to claim 25, **characterized** in that the substrate is made of borosilicate glass.

28. An arrangement according to claim 25, **characterized** in that the substrate is made of quartz.

- 25 29. An arrangement according to claim 25, **characterized** in that the substrate is made of polymer.

30. An arrangement according to claim 22, **characterized** in that the inductor is a three dimensional solenoid.

31. An arrangement according to claim 22, **characterized** in that the inductor is a three dimensional toroid.

32. An arrangement according to claim 22, **characterized** in that the inductor has a high permittivity core.
33. An arrangement according to claim 22, **characterized** in that the inductor is a bulk component external to the micromechanical element.
- 5 34. An arrangement according to claim 21, **characterized** in that the resonance circuit contains at least,
- an inductor connected to a DC voltage source,
 - an micromechanical element with an intrinsic capacitance,
 - a switching element to control for discharging said intrinsic capacitance of said
- 10 micromechanical element.
35. An arrangement according to claim 21, **characterized** in that the resonance circuit is driven by an amplifier stage.
36. An arrangement according to claim 35, **characterized** in that the amplifier stage is controlled with a feedback signal from the resonance circuit.
- 15 37. An arrangement according to claim 18, **characterized** in that means for feeding the first control signal and the second control signal with raised voltage level to the micromechanical element contain a summing element for summing said first control signal and said second control signal.
38. An arrangement according to claim 18, **characterized** in that means for feed-
- 20 ing the first control signal and the second control signal to the micromechanical element contain at least one control electrode.
39. An arrangement according to claim 18, **characterized** in that means for feeding the first control signal and the second control signal to the micromechanical element contain at least two separate control electrodes for said first and said second
- 25 control signals.
40. An arrangement according to claim 38 or 39, **characterized** in that the control electrodes are at least partly covered by a dielectric layer to prevent a galvanic contact between said control electrodes and the micromechanical element.

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